Attachment 7. Physical Benefits and Technical Justification of Projects

Range of Physical Benefits

The range of physical benefits proposed in the SSRWMG's Tier 1 project list include:

- Ecosystem restoration – riparian and wetland restoration including wildlife and plant species;
- Water quality improvements – reduced sedimentation;
- Groundwater storage – groundwater absorption and retention;
- Surface water storage – in restored riparian and wetland ecosystems;
- Flood attenuation – reduced stream velocities, increase in permeable surfaces.

The Springville Disadvantaged Community Phase I Wastewater Treatment Plant Improvement Project

Any physical benefits would be difficult to quantify, therefore, DWR's Table 9 was not included for this project, however the anticipated benefits of the construction project is summarized below.

The intent of the study (Phase I) is to understand, integrate and incorporate the range of potential benefits and characterize, implement and monitor to provide a baseline for the anticipated benefits of the proposed construction project (Phase II). Not all of the benefits of the construction project will be known at the time this application is submitted. They will become more defined and developed as part of the study. The difficultly in funding, coordinating and implementing the project as originally conceived and the engineering work by Keller-Wegley Consulting Engineers triggered the need for the study.

The study will solve the 30-year old problem of how to coordinate and fund the construction of the project (Phase II), address the need to understand the benefits of the project and fully integrate project elements to achieve the full extent of the benefits by providing critical funds to prepare the biological and hydrological information for the CEQA analysis, the draft water quality standards and the initial systems design. The study will gather initial stakeholder feedback and form an advisory committee to assist with project planning and permitting, complete the systems design and coordinate with adjacent landowners for additional water supplies and potential end users of surplus water supplies.

Physical benefits of the proposed construction project (Phase II) include:

1. In-stream benefit to aquatic invertebrates;

2. Water quality improvement through natural wetland filtration;
3. Corridor enhancement- growth of willows, cottonwoods, sycamores, alder;
    a. Reclamation of water;
    b. Wildlife and fishery benefits;
4. Disadvantaged community aesthetic and recreational benefits resulting in improved quality of life and environmental justice;
5. Increased carbon sequestration from wetland restoration and corridor enhancement.

The study (Phase I) will also provide the technical analysis to fully understand and justify the construction project (Phase II). Phase I includes reconnaissance-level biological and hydrological studies to identify and map habitat and sensitive species occurrences and propose avoidance and enhancement options. Focused biological studies provide the required level of detail to fully avoid sensitive species and habitats and understand and mitigate impacts and understand project benefits and benefits of potential enhancements.

The Kern River Watershed Long Meadow Restoration Project

There are many physical benefits to the Kern River Watershed Long Meadow Restoration project. The USFS has determined primary benefits to be:

- Restoring Meadow Habitat
- Restoring Aquatic Habitat
- Removing excessive sedimentation in Long Meadow, Long Meadow Creek, and Wild and Scenic Kern River
- Eliminating excessive bank erosion along the gully
- Eliminating active headcutting in Long Meadow
- Increasing water storage capacity
- Increasing groundwater levels
- Flood retention, delaying spring snowmelt water

These benefits have been justified through the ongoing work of Forest Service and regional experts and personnel. The Forest Service has been monitoring headcut progression since 2005. This work shows continued soil loss and upstream migration of the headcut. Several additional smaller headcuts are becoming established along the sides of the gully. These factors are contributing to continued sedimentation and meadow loss. The total environmental effects have not yet been measured; however, USFS personnel have

measured approximately 3400 cubic yards of soil lost through erosion processes (see Table 9). Bank Surveys completed along the main headcut were done by local hydrologist Joshua Courter on the Sequoia National Forest. His report documents the progression of erosion and sediment delivery into Long Meadow and Long Meadow Creek.[13] The technique was derived from Dave Rosgen's Watershed Assessment for River Stability and Sediment Supply (WARSSS).[14] This technique is also a tool used by the US Environmental Protection Agency. It is because of this ongoing assessment that the project proponent is confident of the benefits being claimed. (http://water.epa.gov/scitech/datait/tools/warsss/)

Jones and Stokes reviewed Plumas Watershed Forum Program's Pond and Plug projects.[15] They found groundwater levels had increased following completion of the project. This in turn increased water storage and extended flow durations.

Jim Wilcox reviewed and implemented the Big Meadows Project (http://bigmeadows.org)[7] on the Sequoia National Forest Hume Lake Ranger District.[16] Following completion of the project, a storm even the following month occurred. A study was completed and determines the Pond and Plug structures did not show any signs of failure and withstood the event.

Without this project, the USFS would not have other opportunities for meadow preservation. The techniques chosen have been done so because of their proven results in other regions. It is from the results in other regions that the USFS has categorized the physical benefits to be expected from the implementation of this project.

The Long Meadow project is a stand-alone project that will not have significant contribution or impact to other projects in the Southern Sierra Region at this time.

The methods used to estimate the physical benefits are described above in the Monitoring, Assessment, and Performance section. The 6 different studies being performed will comprehensively and accurately assess the project benefits for the meadow and its surroundings.

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[13] Courter, Joshua. 2008. *Long Meadow Bank Surveys. Unpublished Report*. Sequoia National Forest, Western Divide Ranger District. Springville, CA. pgs. 5.

[14] Rosgen, Dave. 2006. Watershed Assessment of River Stability and Sediment Supply (WARSSS). Wildland Hydrology. Fort Collins, CO.

[15] ICF Jones & Stokes. 2008. Consultant's Report: Plumas Watershed Forum Program Review. Prepared for Plumas County Flood Control and Water Conservation District. Sacramento: ICF Jones & Stokes.

[16] Wilcox, Jim. 2010. Big Meadows Restoration Project, October 14, 2009 Flood Event Technical Report #1. Feather River Coordinated Resource Management, Plumas Corporation.

Perhaps, one of the most exciting aspects of this project is the lack of potential adverse physical effects. This project has little to no potential of adverse physical effects due to its size and proven track record.

Table 9 – Annual Project Physical Benefits

Project Name: __Kern River Watershed Long Meadow Restoration Project_____

Type of Benefit Claimed: ___Water Quality _____

Measure of Benefit Claimed (Name of Units): _____cubic yards of soil per year_____

Additional Information About this Measure:_____

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project (b) – (c)**
2013	486 yds^3/year	5	481 yds^3/year Reduced soil erosion and sediment delivery to stream Increased groundwater levels and water storage
2014	486	5	481 yds^3/year
2015	486	5	481 yds^3/year
2016	486	5	481 yds^3/year
Comments:			

Kings River Watershed Restoration: Mill Flat Creek Critical Aquatic Refuge Road Decommissioning Project

The benefits of the Mill Flat Creek Project road decommissioning will be improved hydrologic function, reduced impervious road surfaces, reduced habitat fragmentation, and reduced sediment flow (FY2011 Transition Watershed Restoration Action Plan). Recent evaluation of the Sampson Grazing Allotment indicated that the stream was not stable and that Fox Springs Road (FS 13S82) was a source of fine sediment (See Table 9).

Salamanders that use springs are adversely affected by roads, thus retiring this road which circles the spring site will restore connectivity and improve habitat for salamanders. Turtles also need connectivity of habitats (Haws et al. 2012). Western Pond Turtles use terrestrial habitat up to 10 months a year and move about in the watershed and frequently cross roads (Reese and Welsh 1997). A high density of roads surrounding wetlands increase mortality of female turtles on nesting migrations (Steen and Gibbs 2004);

especially since females may be attracted to the disturbed and open artificial habitats on roadsides; which can cause significant road mortality (Aresco 2004).

Table 9 – Annual Project Physical Benefits

Project Name: ___Mill Flat Creek Watershed Restoration Project_____

Type of Benefit Claimed: ___Water Quality Improvement_____

Measure of Benefit Claimed (Name of Units): _____Sedimentation_____

Additional Information About this Measure:_____

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project (b) – (c)**
2013			o
2014	5 yds^3/mile	2 yds^3/mile	3 yds^3/mile
2015	5 yds^3/mile	2 yds^3/mile	3 yds^3/mile
2016	5 yds^3/mile	2 yds^3/mile	3 yds^3/mile

Comments: